

Meeting Name: Fall American Geophysical Union (AGU) Meeting

Meeting website: <http://fallmeeting.agu.org/2013/>

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Title: Analytic Perturbation Method for Estimating Ground Flash Fraction from Satellite Lightning Observations.

Abstract

An analytic perturbation method is introduced for estimating the lightning ground flash fraction in a set of N lightning flashes observed by a satellite lightning mapper. The value of N is large, typically in the thousands, and the observations consist of the maximum optical group area produced by each flash. The method is tested using simulated observations that are based on Optical Transient Detector (OTD) and Lightning Imaging Sensor (LIS) data. National Lightning Detection NetworkTM (NLDN) data is used to determine the flash-type (ground or cloud) of the satellite-observed flashes, and provides the ground flash fraction truth for the simulation runs. It is found that the mean ground flash fraction retrieval errors are below 0.04 across the full range 0-1 under certain simulation conditions. In general, it is demonstrated that the retrieval errors depend on many factors (i.e., the number, N , of satellite observations, the magnitude of random and systematic measurement errors, and the number of samples used to form certain climate distributions employed in the model).